1892MNRAS..52..470S

Royal Grammar School, Lancaster (proposed by John Bone);
Alfred Thomas Odell-Lorrell, Science Lecturer and Examiner, 1 St. Mary's Grove, Chiswick, W. (proposed by D. Milligan);
Edward Stroud, Prisca Coborn Foundation School, Tredegar Square, E. (proposed by J. McCarthy);
John Tatlock, Jun., M.A., New York City, U.S.A. (proposed by S. W. Burnham).

The following were proposed by the Council as Associates of the Society:—

W. L. Elkin, Yale College Observatory, New Haven, Connecticut, U.S.A.;
J. C. Kapteyn, Observatory, Gröningen, Holland;
Hugo Seeliger, Royal Observatory, Munich, Bavaria;
Hermann Struve, Observatory, Pulkowa, Russia.

Seventy-seven presents were announced as having been received since the last meeting, including, amongst others:—

Original negatives of *Jupiter* (12 plates), taken with the great telescope of the Lick Observatory, presented by the Observatory; Original negative of Swift's Comet, taken at the Sydney Observatory, presented by H. C. Russell; Photograph of the region surrounding η *Argûs*, enlargement from a negative taken by Dr. Gill at the Royal Observatory, Cape of Good Hope, presented by the President; Photographs of the "Crab" Nebula (1 M *Tauri*), presented by Isaac Roberts; R. Wolf, *Geschichte der Astronomie*, third half-volume, presented by the author; Photograph of the Total Solar Eclipse of 1871 (positive copy on glass), taken in Java, presented by Professor Oudemans; Oxygen bottle for use with the lantern at evening meetings, presented by E. Ristori.

Observations of the Moon made at the Radcliffe Observatory, Oxford, during the year 1891; *and a Comparison of the Results with the Tabular Places from Hansen's Lunar Tables.* By E. J. Stone, M.A., F.R.S., Radcliffe Observer.

The present paper contains the observations of the Right Ascensions and North Polar Distances of the Moon, made at the Radcliffe Observatory during the year 1891. These results are here compared with those deduced from Hansen's Lunar Tables on two suppositions:—

(1) That the mean times found in the usual way, from the sidereal times at mean noon given in the *Nautical Almanac*, were not altered in scale, or affected with any different systematic errors of determination, by

1892MNRAS..52..470S

the adoption in 1864 of a different ratio of the Julian year of 365¼ "mean solar days" to the mean tropical year.

(2) That the "mean times," which accurately correspond to a given "sidereal time of a meridian," were necessarily changed in 1864 by the use of a different ratio of the "Julian year" and therefore of the "mean solar day," to the mean tropical year, to fix the tabular Right Ascensions of the clock stars at the meridian transits. It is from these tabular Right Ascensions of the clock stars that the observed Right Ascensions are deduced by the aid of clocks; and the Right Ascensions thus found are finally rendered definite by a direct reference to the positions of the Sun deduced from the North Polar Distances and Obliquities of the Ecliptic.

In the Appendix to the *Monthly Notices*, vol. l., will be found the results of a comparison between the Greenwich Lunar Observations, 1847–1861, and Hansen's Tables, of greater accuracy than had before been available for use; and these results have been utilised to form the mean results given in Table III.

An examination of the residual errors shows that the motion of the Moon was closely represented by Hansen's Tables during the period 1847–1863, although periodical errors of no inconsiderable amount, due either to defects of theory or to imperfections in the practical methods of comparing the theoretical and observational results, are shown to exist.

The mean annual error in longitude of Hansen's Tables from 1847 to 1863 is, however, only $-1''\cdot85$, and no law of regular increase is apparent; but Table III. shows that when the time, *t*, is found as at present, the mean annual error has increased since 1863 at an average rate of $0''\cdot75$ per annum, and that the error now amounts to $+19''$. The mean annual error of Hansen's Tables from 1864 to 1891 taken out with the *corrected* argument is $-1''\cdot49$, which differs but very slightly from the mean error between 1847 and 1863.

For facilities for an accurate comparison between Hansen's Lunar Tables and Observations I am again indebted to the places published in the *Connaissance des Temps*.

TABLE I.

Radcliffe Observations of the Moon, 1891.

R.A.'s and N.P.D.'s of the Centre of the Moon, 1891; *compared with Hansen's Tabular Places*, **Uncorrected** *and* **Corrected** *for the change in the Unit of Mean Time introduced in the year* 1864.

Day, 1891.		Correction to be subtracted from M.T. for change of Sidereal Time at Mean Noon since 1864.	Observer.	Limb observed in R.A.	Observed R.A.	R.A. from Hansen's Tables for Uncorrected Mean Times.	Hansen *minus* Observed. **Uncorrected.**	Correction due to the Change in the Unit of Mean Time.	Hansen *minus* Observed. **Corrected.**	Limb observed in N.P.D.	Observed N.P.D.	N.P.D. from Hansen's Tables for Uncorrected Mean Times.	Hansen *minus* Observed. **Uncorrected.**	Correction due to the Change in the Unit of Mean Time.	Hansen *minus* Observed. **Corrected.**
		s			h m s	s	s	s	s		° ′ ″	″	″	″	″
Jan.	4	40·04	R.	II.	14 20 3·13	4·12	+0·99	−1·33	−0·34	S.	100 33 55·53	63·31	+ 7·78	− 8·37	−0·59
	5	40·05	R.	II.	15 11 8·18	9·27	+1·09	−1·43	−0·34	S.	105 32 30·41	37·73	+ 7·32	− 7·62	−0·30
	16	40·09	R.	I.	1 19 1·12	2·19	+1·07	−1·40	−0·33	S.	86 10 50·53	42·12	− 8·41	+ 9·79	+1·38
	17	40·09	R.	I.	2 10 42·46	43·65	+1·19	−1·39	−0·20	S.	80 21 10·66	2·68	− 7·98	+ 8·98	+1·00
	21	40·11	R.	I.	5 46 33·76	35·14	+1·38	−1·51	−0·13	N. & S.	65 25 6·06	3·46	− 2·60	+ 2·29	−0·31
	22	40·11	W.	I.	6 42 53·89	55·26	+1·37	−1·51	−0·14	N.	64 40 1·95	2·50	+ 0·55	+ 0·13	+0·68
	24	40·12	R.	I. & II.	8 32 33·85	35·06	+1·21	−1·43	−0·22	N.	67 3 34·65	38·20	+ 3·55	− 3·85	−0·30
	29	40·14	F. B.	II.	12 29 40·60	41·82	+1·22	−1·20	+0·02	S.	88 7 33·44	39·11	+ 5·67	− 8·54	−2·87
Feb.	1	40·15	R.	II.	14 48 27·24	28·24	+1·00	−1·35	−0·35	S.	103 39 8·07	16·07	+ 8·00	− 7·80	+0·20
	16	40·21	F. B.	I.	4 33 18·45	19·71	+1·26	−1·50	−0·24	S.	68 10 47·93	44·30	− 3·63	+ 5·00	+1·37
	17	40·22	R.	I.	5 29 9·92	11·03	+1·11	−1·51	−0·40	S.	65 43 39·01	37·41	− 1·60	+ 2·91	+1·31
	23	40·24	F. B.	II.	10 44 31·97	33·18	+1·21	−1·26	−0·05	N.	76 38 20·36	27·75	+ 7·39	− 7·42	−0·03
	25	40·25	R.	II.	12 14 49·18	50·13	+0·95	−1·21	−0·26	S.	86 33 31·22	38·62	+ 7·40	− 8·56	−1·16
	26	40·25	F. B.	II.	12 59 12·62	13·73	+1·11	−1·21	−0·10	S.	91 51 16·31	25·12	+ 8·81	− 8·68	+0·13

1892MNRAS..52..470S

1892MNRAS..52..470S

Day, 1891.		Correction to be subtracted from M.T. for change of Sidereal Time at Mean Noon since 1864.	Observer.	Limb observed in R.A.	Observed R.A.	R.A. from Hansen's Tables for Uncorrected Mean Times.	Hansen *minus* Observed. **Uncorrected.**	Correction due to the Change in the Unit of Mean Time.	Hansen *minus* Observed. **Corrected.**	Limb observed in N.P.D.	Observed N.P.D.	N.P.D. from Hansen's Tables for Uncorrected Mean Times.	Hansen *minus* Observed. **Uncorrected.**	Correction due to the Change in the Unit of Mean Time.	Hansen *minus* Observed. **Corrected.**
		s			h m s	s	s	s	s		° ′ ″	″	″	″	″
Feb.	27	40·26	W.	II.	13 44 19·54	20·76	+1·22	−1·24	−0·02	S.	97 8 12·04	23·81	+11·77	− 8·50	+3·27
Mar.	20	40·34	R.	I.	8 50 47 95	49·06	+1·11	−1·40	−0·29	N.	67 44 28·49	31 84	+ 3·35	− 4·58	−1·23
	21	40·35	F. B.	I.	9 41 8·21	9·32	+1·11	−1·33	−0·22	N.	71 1 3·60	7·45	+ 3·85	− 6·04	−2·19
	26	40·37	F. B.	II.	13 29 40·56	41·63	+1·07	−1·24	−0·17	S.	95 35 35·53	44·86	+ 9·33	− 8·74	+0·59
	30	40·38	F. B.	II.	16 52 23·07	24·40	+1·33	−1·56	−0 23	S.	113 13 49·45	56·63	+ 7 18	− 4·44	+2·74
Apr.	17	40·45	R.	I.	9 23 36·90	37·86	+0·96	−1·37	−0·41	N.	69 33 51·90	55·98	+ 4·08	− 5·63	−1·55
	20	40·47	W.	I.	11 44 19·43	20·31	+0·88	−1·22	−0·34	N.	82 55 53·93	59 07	+ 5·14	− 8·50	−3·36
	22	40·47	R.	I.	13 13 46·35	47·20	+0·85	−1·24	−0·39	N.	93 41 56·94	64 64	+ 7·70	− 8·95	−1·25
	23	40·48	F. B.	I. & II.	13 59 55·42	56·54	+1·12	−1·29	−0·17	N. & S.	99 5 36·23	43·13	+ 6·90	− 8·67	−1·77
	25	40·49	R.	II.	15 39 43·47	44·56	+1·09	−1·45	−0·36	S.	108 45 32·61	37·83	+ 5·22	− 6·82	−1·60
May	15	40·57	R.	I.	9 53 41·54	42·45	+0·91	−1·34	−0·43	N.	71 42 5·56	10·40	+ 4·84	− 6·51	−1·67
	16	40·57	F. B.	I.	10 41 19·62	20·70	+1·08	−1·27	−0·19	N.	76 0 25·63	30·46	+ 4·83	− 7·57	−2·74
	19	40·58	R.	I.	12 56 2·49	3·37	+0·88	−1·23	−0·35	N.	91 29 28·23	34·97	+ 6·74	− 8·99	−2·25
	31	40·63	R.	II.	0 10 39·28	40·63	+1·35	−1·45	−0·10	N.	94 2 37·28	26·16	−11·12	+10·46	−0 66
June	12	40·68	R.	I.	10 22 2·39	3·35	+0·96	−1·31	−0·35	N.	74 10 34 48	39·92	+ 5 44	− 7·23	−1·79
	16	40·69	R.	I.	13 22 4·81	5·61	+0·80	−1·24	−0·44	N.	94 40 8·05	15·73	+ 7·68	− 8·93	−1·25
	19	40·71	R.	I.	15 49 59·28	60·62	+1·34	−1·50	−0·16	N.	109 33 32·90	39·38	+ 6·48	− 6·70	−0·22
	20	40·71	F. B.	I.	16 47 8·19	9·76	+1·57	−1 62	−0·05	N. & S.	113 7 50·76	55 49	+ 4·73	− 4·87	−0·14

1892MNRAS..52..470S

Day, 1891.	Correction to be subtracted from M.T. for change of Sidereal Time at Mean Noon since 1864. (s)	Observer.	Limb observed in R.A.	Observed R.A. (h m s)	R.A. from Hansen's Tables for Uncorrected Mean Times. (s)	Hansen *minus* Observed. **Uncorrected.** (s)	Correction due to the Change in the Unit of Mean Time. (s)	Hansen *minus* Observed. **Corrected.** (s)	Limb observed in N.P.D.	Observed N.P.D. (° ′ ″)	N.P.D. from Hansen's Tables for Uncorrected Mean Times. (″)	Hansen *minus* Observed. **Uncorrected.** (″)	Correction due to the Change in the Unit of Mean Time. (″)	Hansen *minus* Observed. **Corrected.** (″)
June 25	40·73	F. B.	II.	22 2 49·13	50·94	+1·81	−1·61	+0·20	N.	107 28 46·57	37·99	− 8·58	+ 8·21	−0·37
July 16	40·81	R.	I.	15 25 21·99	23·01	+1·02	−1·43	−0·41	N.	107 43 13·74	17·78	+ 4·04	− 7·22	−3·18
17	40·82	F. B.	I.	16 19 49·15	50·53	+1·38	−1·55	−0·17	N.	111 41 25·32	30·96	+ 5·64	− 5·73	−0·09
24	40·85	R.	II.	23 35 29·25	30·83	+1·58	−1·52	+0·06	N.	97 55 36·25	25·52	−10·73	+10·53	−0·20
27	40·86	F. B.	II.	2 16 26·27	27·82	+1·55	−1·47	+0·08	N.	78 50 50·82	41·81	− 9·01	+ 9·51	+0·50
Aug. 13	40·93	W.	I.	15 55 10·52	11·79	+1·27	−1·47	−0·20	N.	110 16 23·34	27·21	+ 3·87	− 6·30	−2·43
27	40·98	W.	II.	5 44 36·03	37·76	+1·73	−1·61	+0·12	N.	64 23 41·36	39·52	− 1·84	+ 2·32	+0·48
Sept. 10	41·04	W.	I.	16 28 23·14	24·42	+1·28	−1·51	−0·23	N.	112 40 46·60	49·83	+ 3·23	− 5·18	−1·95
11	41·04	R.	I.	17 25 23·73	24·78	+1·05	−1·62	−0·57	N.	115 13 23·27	27·23	+ 3·96	− 3·12	+0·84
12	41·05	F. B.	I.	18 26 10·94	12·38	+1·44	−1·71	−0·27	S.	116 22 19·82	17·49	− 2·33	− 0·57	−2·90
14	41·05	W.	I.	20 33 46·97	48·47	+1·50	−1·75	−0·25	S.	113 32 28·82	25·04	− 3·78	+ 5·27	+1·49
15	41·06	R.	I.	21 36 58·10	59·55	+1·45	−1·71	−0·26	S.	109 30 30·67	22·47	− 8·20	+ 7·92	−0·28
16	41·06	F. B.	I.	22 38 2·82	4·40	+1·58	−1·64	−0·06	S.	104 2 12·08	1·85	−10·23	+ 9·97	−0·26
23	41·09	R.	II.	5 24 9·20	10·86	+1·66	−1·65	+0·01	N.	64 43 19·68	16·35	− 3·33	+ 3·23	−0·10
Oct. 12	41·17	F. B.	I.	21 8 33·90	35·35	+1·45	−1·67	−0·22	S.	111 42 38·62	34·72	− 3·90	+ 6·61	+2·71
14	41·17	R.	I.	23 6 50·07	51·29	+1·22	−1·58	−0·36	S.	101 5 10·14	0·49	− 9·65	+10·56	+0·91
15	41·18	W.	I.	0 3 40·45	41·85	+1·40	−1·56	−0·16	S.	94 22 43·26	33·60	− 9·66	+11·50	+1·84
16	41·18	R.	I.	1 0 0·76	2·01	+1·25	−1·56	−0·31	S.	87 20 31·93	21·27	−10·66	+11·64	+0·98

1892MNRAS..52..470S

Day, 1891.	Correction to be subtracted from M.T. for change of Sidereal Time at Mean Noon since 1864.	Observer.	Limb observed in R.A.	Observed R.A.	R.A. from Hansen's Tables for Uncorrected Mean Times.	Hansen *minus* Observed. **Uncorrected.**	Correction due to the Change in the Unit of Mean Time.	Hansen *minus* Observed. **Corrected.**	Limb observed in N.P.D.	Observed N.P.D.	N.P.D. from Hansen's Tables for Uncorrected Mean Times.	Hansen *minus* Observed. **Uncorrected.**	Correction due to the Change in the Unit of Mean Time.	Hansen *minus* Observed. **Corrected.**
	s			h m s	s	s	s	s		° ′ ″	″	″	″	″
Oct. 23	41·21	W.	II.	7 58 45·17	46·81	+1·64	−1·57	+0·07	S.	64 42 32·93	36·51	+ 3·58	− 3·29	+0·29
Nov. 9	41·28	W.	I.	21 46 15·85	17·25	+1·40	−1·60	−0·20	S.	109 1 66·77	59·26	− 7·51	+ 7·85	+0·34
11	41·29	F. B.	I.	23 38 13·76	15·09	+1·33	−1·51	−0·18	S.	97 32 34·31	25·02	− 9·29	+10·84	+1·55
13	41·29	R.	I.	1 27 40·28	41·42	+1 14	−1·54	−0·40	S.	83 57 46·35	35·88	−10·47	+11·23	+0 76
17	41·31	W.	II.	5 27 58·90	60·59	+1·69	−1·76	−0·07	N.	64 22 22·97	21·41	− 1·56	+ 3·30	+1·74
20	41·32	W.	II.	8 30 57·54	59·13	+1·59	−1·55	+0·04	S.	66 0 19·85	25·50	+ 5·65	− 4·59	+1·06
22	41·33	R.	II.	10 14 48·25	49·40	+1·15	−1·34	−0·19	S.	73 28 0·06	5·41	+ 5·35	− 7·54	−2·19
Dec. 8	41·39	R.	I.	23 19 52·59	53·85	+1·26	−1·49	−0·23	S.	99 39 39·82	29·88	− 9·94	+10·27	+0·33
11	41·41	R.	I.	1 59 28·79	29·99	+1·20	−1·52	−0·32	S.	80 9 57·21	46·41	−10·80	+10·47	−0·33
15	41·42	W.	II.	5 59 49·26	50·87	+1·61	−1·76	−0·15	N.	63 37 45·70	43·59	− 2·11	− 1·80	−0·31
16	41·43	R.	II.	7 3 0·30	1·83	+1·53	−1·72	−0·19	N.	63 25 44·88	46·58	+ 1·70	− 1·10	+0·60
17	41·43	F. B.	II.	8 3 43·44	44·95	+1·51	−1·63	−0·12	S.	64 53 22·58	27·90	+ 5·32	− 3·66	+1·66
18	41·43	W.	II.	9 0 33·91	35·44	+1·53	−1·52	+0·01	S.	67 44 3·89	11·39	+ 7·50	− 5·71	+1·79
20	41·44	R.	II.	10 41 56·02	57·23	+1·21	−1·32	−0·11	S.	76 14 39·28	46·42	+ 7·14	− 8·21	−1·07
22	41·45	W.	II.	12 11 54·33	55·55	+1·22	−1·22	0·00	S.	86 41 6·74	16·72	+ 9·98	− 9·13	+0 85
Mean of Errors, without regard to sign ...					...	**1·268** s	...	**0·216** s		...	...	**6·271** ″	...	**1·204** ″
Mean Errors for year		...	...	...	...	**+1 268**	...	**−0·197**						

1892MNRAS..52..476S

TABLE II.

Radcliffe Observations of the Moon, 1891.

Errors of the Moon's Tabular Place in Longitude and Ecliptic Polar Distance, **Uncorrected** *and* **Corrected** *for the Change in the Unit of Mean Time introduced in the year* 1864.

Day, 1891.	Observer.	Limb observed in R.A.	Limb observed in N.P.D.	Errors of Longitude (Hansen *minus* Observed). Uncorrected.	Errors of Longitude (Hansen *minus* Observed). Corrected.	Errors of E.N.P.D. (Hansen *minus* Observed). Uncorrected.	Errors of E.N.P.D. (Hansen *minus* Observed). Corrected.
				″	″	″	″
Jan. 4	R.	II.	S.	+16·37	−4·94	+2·60	+1·08
5	R.	II.	S.	+17·16	−4·82	+2·85	+1·02
Jan. 16	R.	I.	S.	+18·07	−5·11	−1·77	−0·58
17	R.	I.	S.	+19·31	−3·13	−1·59	−0·05
21	R.	I.	N. & S.	+18·87	−1·76	−2·13	−0·35
22	W.	I.	N.	+18·55	−1·84	−0·79	+0·82
24	R.	I. & II.	N.	+17·10	−3·02	−0·66	+0·45
29	F.B.	II.	S.	+19·18	−0·87	−2·02	−2·76
Feb. 1	R.	II.	S.	+16·33	−4·82	+3·32	+1·70
Feb. 16	F.B.	I.	S.	+17·92	−3·51	−1·02	+0·86
17	R.	I.	S.	+15·23	−5·53	−0·83	+1·03
23	F.B.	II.	N.	+19·20	−0·69	+0·17	+0·25
25	R.	II.	S.	+16·10	−4·06	+1·13	+0·49
26	F.B.	II.	S.	+18·78	−1·33	+1·71	+0·70
27	W.	II.	S.	+21·23	+0·90	+4·46	+3·16
Mar. 20	R.	I.	N.	+15·79	−4·22	−0·93	−0·10
21	F.B.	I.	N.	+16·19	−3·68	−1·52	−1·05
26	F.B.	II.	S.	+18·34	−2·15	+2·77	+1·48
30	F.B.	II.	S.	+19·04	−2·83	+5·01	+3·09
Apr. 17	R.	I.	N.	+14·15	−5·98	−0·32	+0·32
20	W.	I.	N.	+14·14	−6·01	−0·50	−1·07
22	R.	I.	N.	+14·73	−5·89	+2·31	+1·05
23	F.B.	I. & II.	N. & S.	+17·98	−2·98	+0·73	−0·79
25	R.	II.	S.	+16·27	−5·34	+1·55	−0·39
May 15	R.	I.	N.	+13·89	−6·35	+0·13	+0·52
16	F.B.	I.	N.	+16·45	−3·61	−1·45	−1·50
19	R.	I.	N.	+14·82	−5·73	+1·10	−0·04
31	R.	II.	N.	+23·12	−1·12	−2·17	−1·21
June 12	R.	I.	N.	+14·94	−5·38	+0·03	+0·17
16	R.	I.	N.	+14·01	−6·59	+2·63	+1·31
19	R.	I.	N.	+19·89	−2·26	+2·28	+0·27
20	F.B.	I.	N. & S.	+22·08	−0·70	+2·00	−0·05
25	F.B.	II.	N.	+27·37	+2·82	+0·97	+0·65

1892MNRAS..52..470S

Day, 1891.		Observer.	Limb observed in R.A.	Limb observed in N.P.D.	Errors of Longitude (Hansen *minus* Observed). Uncorrected.	Errors of Longitude (Hansen *minus* Observed). Corrected.	Errors of E.N.P.D. (Hansen *minus* Observed). Uncorrected.	Errors of E.N.P.D. (Hansen *minus* Observed). Corrected.
					"	"	"	"
July	16	R.	I.	N.	+15·14	−6·48	+0·30	−1·63
	17	F.B.	I.	N.	+19·91	−2·35	+2·33	+0·31
	24	R.	II.	N.	+25·91	+0·90	−0·51	+0·17
	27	F.B.	II.	N.	+24·54	+0·95	−0·97	+0·86
Aug.	13	W.	I.	N.	+18·29	−3·25	+0·12	−1·80
	27	W.	II.	N.	+23·48	+1·61	−1·18	+0·53
Sept.	10	W.	I.	N.	+18·01	−3·45	+0·44	−1·43
	11	R.	I.	N.	+14·47	−7·67	+3·10	+1·30
	12	F.B.	I.	S.	+19·43	−3·49	−1·45	−3·06
	14	W.	I.	S.	+21·00	−3·72	+1·47	+0·59
	15	R.	I.	S.	+22·15	−3·40	−1·14	−1·45
	16	F.B.	I.	S.	+25·26	−0·71	−0·87	−0·57
	23	R.	II.	N.	+22·70	+0·14	−1·91	−0·09
Oct.	12	F.B.	I.	S.	+20·53	−3·74	+2·17	+1·70
	14	R.	I.	S.	+20·39	−5·26	−1·92	−1·22
	15	W.	I.	S.	+23·16	−2·94	−0·51	+0·73
	16	R.	I.	S.	+21·43	−4·67	−2·63	−0·88
	23	W.	II.	S.	+22·59	+0·99	−0·87	+0·10
Nov.	9	W.	I.	S.	+21·32	−2·80	−0·46	−0·62
	11	F.B.	I.	S.	+21·92	−3·08	−0·67	+0·36
	13	R.	I.	S.	+19·71	−5·83	−3·42	−1·50
	17	W.	II.	N.	+22·90	−1·04	−0·29	+1·68
	20	W.	II.	S.	+22·58	+0·79	+0·18	+0·89
	22	R.	II.	S.	+17·44	−3·35	−0·91	−1·07
Dec.	8	R.	I.	S.	+21·11	−3·27	−1·81	−1·03
	11	R.	I.	S.	+20·39	−4·33	−4·01	−1·94
	15	W.	II.	N.	+21·64	−2·02	−2·11	−0·31
	16	R.	II.	N.	+20·65	−2·47	−0·56	+0·87
	17	F.B.	II.	S.	+21·23	−1·26	+0·98	+1·96
	18	W.	II.	S.	+22·57	+0·64	+1·18	+1·68
	20	R.	II.	S.	+19·10	−1·90	−0·03	−0·39
	22	W.	II.	S.	+20·85	+0·34	+1·90	+0·78
Mean of Errors, without regard to sign		...	...	...	**19·298**	**3·212**	**1·505**	**0·982**
Mean Errors for Year		...	...	...	**+19·298**	**−2·902**	...	...

Observers: W., Mr. W. Wickham; R., Mr. W. H. Robinson; F.B., Mr. F. A. Bellamy.

1892MNRAS..52..470S

Table III.

Mean Excess over Observation of the Moon's Tabular Place in Longitude for the years 1847 *to* 1891, *as computed from Hansen's Tables.*

Uncorrected *and* **Corrected** *for the change in the Unit of Mean Time introduced in the year* 1864.

Year.	Errors of Longitude (Hansen *minus* Observed). **Uncorrected.**	**Corrected.**
	″	″
1847	+ 0·51	+0·51
1848	− 0·53	−0·53
1849	− 1·08	−1·08
1850	− 0·97	−0·97
1851	− 1·93	−1·93
1852	− 1·57	−1·57
1853	− 2·18	−2·18
1854	− 2·34	−2·34
1855	− 1·40	−1·40
1856	− 1·51	−1·51
1857	− 2·41	−2·41
1858	− 2·61	−2·61
1859	− 2·49	−2·49
1860	− 3·62	−3·62
1861	− 2·95	−2·95
1862	− 2·83	−2·83
1863	− 1·61	−1·61
1864	+ 0·12	−0·81
1865	+ 1·27	−0·22
1866	+ 2·14	−0·22
1867	+ 3·48	+0·36
1868	+ 4·12	+0·28
1869	+ 4·28	−0·35
1870	+ 4·83	−0·66
1871	+ 6·96	+0·44
1872	+ 7·31	+0·10
1873	+ 8·24	+0·20
1874	+ 9·29	+0·56
1875	+ 9·87	+0·36
1876	+ 9·80	−0·50
1877	+ 9·23	−1·90
1878	+ 8·22	−3·60
1879	+ 9·63	−3·12
1880	+10·89	−2·77
1881	+10·51	−4·06
1882	+12·68	−2·51
1883	+14·71	−1·50
1884	+14·65	−1·91
1885	+15·20	−1·82
1886	+15·34	−2·53
1887	+15·70	−3·25
1888	+17·68	−2·46
1889	+17·37	−3·51
1890	+18·02	−3·55
1891	+19·30	−2·90

1847 to 1879: Greenwich observations. 1880 to 1882: Mean of Greenwich and Radcliffe. 1883 to 1891: Radcliffe observations.

Radcliffe Observatory, Oxford:
1892 *May* 13.

1892MNRAS..52..470S

Note on the Secular Perturbations of the Earth by Mars.
By R. T. A. Innes.

In my computation, printed in this volume on pages 80 to 87, I do not find for $\left[\frac{dp}{dt}\right]_{00}$ and $\left[\frac{dq}{dt}\right]_{00}$ the values given by Le Verrier in *Mémoires de l'Observatoire de Paris*, tome ii. Mr. Asaph Hall, Jun., has also performed the calculation by Gauss's method,* and finds for these functions practically the same values as computed by Professor Hill by algebraical expansion.† I therefore revised my figures, and not finding any material difference I examined the formulæ given in vol. i. of the *Astronomical Papers of the American Ephemeris*, with the result that I found a misprint in the value of J_3 on pages 338 and 359 For sin Π read sin Π'. My figures, altered accordingly, make J_3 so nearly the value found by Mr. Hall that it is needless to finish the calculation.

It will be interesting to compare the values of the secular perturbations of the Earth caused by *Mars* found by Le Verrier and Professor Hill by expansion with those found by Gauss's method by Mr. Hall and myself. Reducing all to the mass of *Mars* used by Mr. Hall, viz. $\frac{1}{m'} = 3093500$, we have—

$\left[\frac{de}{dt}\right]_{00}$	−0″·015723	Hall.	$\left[\frac{d\pi}{dt}\right]_{00}$	+0″·975139	Hall.
	−0·015734	Le Verrier.		+0·975430	Le Verrier.
	−0·015722	Innes.		+0·975224	Innes.
$\left[\frac{dp}{dt}\right]_{00}$	+0·006344	Hall.	$\left[\frac{dq}{dt}\right]_{00}$	−0·007195	Hall.
	+0·006336	Hill.		−0·007211	Hill.
	+0·006351	Le Verrier.		−0·007209	Le Verrier.

$\left[\frac{dL}{dt}\right]_{00}$	0″·23424	Hall.
	0·23368	Le Verrier.
	0·23469	Innes.

Erratum in my previous communication:—

$$\text{Page 81, read } v' = \frac{\sqrt{3}}{32\, m_{,}^{2}}\left\{1 + 2\frac{\lambda^{4}}{m_{,}^{2} m_{,,}^{2}} + 4\frac{\lambda^{12}}{m_{,}^{6} m_{,,}^{4} m_{,,,}^{2}} + \&c.\right\}$$

There are a few other misprints, but they are of no importance.

The second part of the expression for J_3 on page 81, and J_3 and $\frac{a}{r} W_0$ on page 85, are incorrect for the reason pointed out above.

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* *Astronomical Journal*, vol. xi., No. 4, July 24, 1891.

† *Astronomical Papers of the American Ephemeris*, vol. iv., pp. 511–12.

Sydney: 1892 *March* 7.